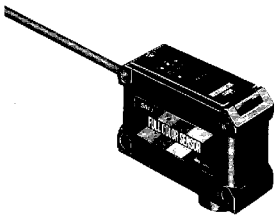
EB-216

idec

SA1J

Full Color Recognition Sensors

Operating Instructions



IDEC IZUMI CORPORATION

Type No.	Output Type	Spot Size
SA1J-C1N1	NPN Output	Standard
SA1J-C2N1	NPN Output	Small
SA1J-C1P1	PNP Output	Standard
SA1J-C2P1	PNP Output	Small

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SPECIFICATIONS

Type No.	SA1J-C1N1			SA1J-C2N1			SA1J-C1P1			SA1J-C2P1		
Power Voltage	12 to 24V DC, ripple 10% maximum (Operating voltage: 10 to 30V DC)											
Current Draw	150mA maximum											
Sensing Range (mm)	40	50	60	15	20	25	40	50	60	15	20	25
Inspection Spot Diameter (mm)	Ø4	Ø6	Ø8	Ø2.5	Ø3	Ø4.5	Ø4	Ø6	Ø8	Ø2.5	Ø3	Ø4.5
Light Source	Three LEDs (Red, Green, Blue)											
Response Time	Selectable from FAST (0.3msec), NORMAL (1msec), or SLOW (5msec)											
Control Output	NPN open collector 30V DC, 100mA max. Voltage drop 1.5V maximum protected against short circuit.						PNP open collector 30V DC, 100mA max. Voltage drop 1.5V maximum protected against short circuit.					
SET Input	30V DC max. /3.6mA (when connected to 0V.) Typical						30V DC max. /3mA (when connected to 24V.) Typical					
External Synchronous Input	Operating voltage (0V) +4V maximum						Operating voltage (+V) -4V minimum					
Operation Indicator	Yellow LED											
Timer	Off-delay timer 40msec											
Output Operation	Light ON											
Operating Temperature	-10 to +50°C (Without freezing)											
Storage Temperature	-30 to +70°C											
Operating Humidity	35 to 85% RH (Without condensation)											
Extraneous Light Immunity	Sunlight: 10,000 Lx maximum, Halogen lamp: 3,000 Lx maximum											
Vibration Resistance	10 to 55Hz, Single Amplitude: 0.75mm, 2 hours each in 3 axes (at power off)											
Shock Resistance	490 m/sec² 5 shocks each in 3 axes at power off)											
Degree of Protection	IP67											
Cable	0.2mm² Ø5.4 mm 5-core oiltight vinyl cabtyre cable, 2m long											
Functions: Reference Color Set	Teaching system, 1 color											
Functions: Inspection Tolerance	5-step digital setting											
Functions: Inspection Mode	Color (C)/Color + Intensity (C+I) selectable											
Functions: Synchronous Mode	Internal Synchronous Mode/External Synchronous Mode selectable											
Functions: Response Mode	Selectable from Fast (F), Normal (N), or Slow (S)											
Functions: Off-delay Timer	Selectable from Timer ON (T-ON) or Timer OFF (T-OFF)											
Material	Housing: Aluminum, Lens: Glass, Cover: PAR											
Weight	Approx. 250g											
Dimensions (mm)	50H x 30W x 80D											
Attachments	Adjusting Screwdriver											

⚠ NOTES FOR SAFETY

Read the operating instructions carefully before installation, wiring, operation, maintenance, and check. This operating instructions should be distributed to the actual sensor users.

NOTES FOR INSTALLATION

- Do not use the sensor near an induction machine and heat source, or they are subjected to strong shocks or vibrations, large amounts of dust, corrosive gases, water for a long period of time, oil and chemicals.
- The receiver should not be exposed to excessive extraneous light.
- When the sensing area on the front of sensor has dust built-up, clean it with a soft cloth dipped in alcohol. Do not use organic solvents such as thinner.
- Do not tighten the mounting screws excessively for mounting the sensors, otherwise, the protection characteristics may be damaged. The tightening torque for mounting screws should be within 2.0N•m.
- Do not apply voltage exceeding the rated voltage between the power supply and housing.
- When installing the SA1J sensors in parallel, keep the sensors apart from each other by 30mm or more.

SWITCH OPERATION

- Turning torque for setting the inspection tolerance should not exceed 0.02N•m.
- Press the button securely, but operating load for Reference Color Set Switch should not exceed 30N.

WIRING

- Connect correctly because miswiring will cause damage.
- The power voltage should not exceed the rated range.
- Do not install high-voltage and power lines in the same conduit with input and output lines. Use separate conduit.
- When wiring is long, or the influence of power line and electromagnetic equipment may occur, use a separate conduit for wiring.
- When using a switching power supply, be sure to ground the FG (frame ground) terminal.
- Cable extension is allowed up to 100m using a cabtyre cable with core wires of 0.3mm or more.

OPERATION AT POWER ON

- The light source lamp does not go on immediately when power is turned on because the sensor contains a circuit to keep the output off for two seconds.
- To ensure stable sensing, run the test operation for about 15 minutes.

REFERENCE COLOR MEMORY

Since EEPROM is used for reference color memory, no back-up is required.

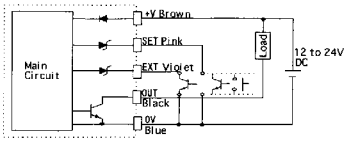
CONNECTION METHOD

• Lead Wire

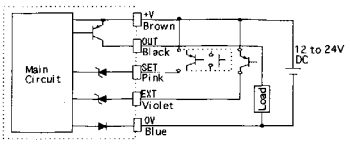
Lead Wire Color	Name	Function
Brown	+V	Power Voltage 12 to 24V
Blue	0V	Power Ground
Pink	SET	Set Input
Violet	EXT	External Synchronous Input
Black	OUT	Control Output

• CONNECTION EXAMPLE

SA1J-C1N1/SA1J-C2N1

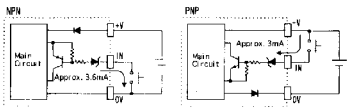


SA1J-C1N1/SA1J-C2N1

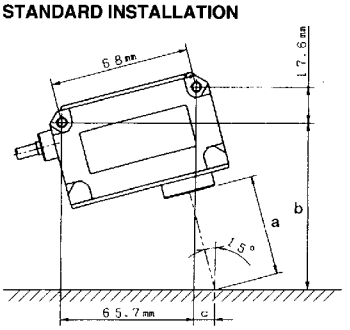


Use the non-contact output sensor for external synchronous input to prevent chattering.

• Input Circuit



STANDARD INSTALLATION



Type No.	a	b	c
SA1J-C1□1	50mm	82.5mm	10.2mm
SA1J-C2□1	20mm	53.5mm	2.5mm

- Install the sensor in such a way that the distance a between lens and object conforms to the lengths shown in the table above.
- The optical axis is tilted by approx. 15° to the vertical direction of the object surface.
- The spot center is positioned away from the mounting hole by the horizontal distance c.
- Since the best installation position is changeable depending on the detected object, determine the best installation to ensure stable sensing, referring to the table above.
- Since the sensing direction in Figure 1 is less affected by the changes in the sensing angle than in Figure 2, install the sensor as shown in Figure 1.Moving direction of the object should be shown as in Figure 3.

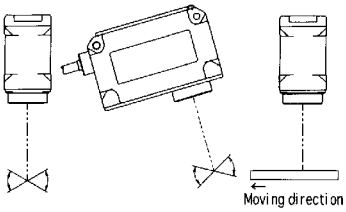
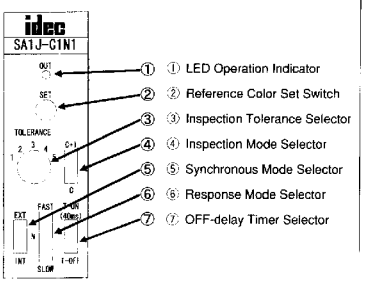


Figure 1. Figure 2. Figure 3.

OPERATION PANEL (Name and Function)



INDICATION FUNCTIONS

① LED Operation Indicator

LED operation indicator goes on when the output is on.

SWITCH FUNCTIONS

② Reference Color Set Switch

This switch is used to register a reference color. A reference color can also be registered by inputting an external signal. When this switch is pressed or the external signal is inputted, the existing reference color is replaced by the new reference color.

③ Inspection Tolerance Selector

The selector is used to select the degree of the inspection tolerance which allows for a difference from the reference color. The inspection tolerance can be selected in 5 steps. The inspection tolerance is smaller at a small number.

Note: When setting the degree to the positions except 1, 2, 3, 4, and 5, the degree of inspection tolerance becomes 5 automatically.

④ Inspection Mode Selector

This selector is used to select "C" inspection mode or "C+I" inspection mode.

• "C" Inspection Mode

Since this mode inspects color components (R•G•B color difference) only, the sensor is scarcely influenced by surrounding lights and deflections. This mode is ideal for detecting different kind of objects.

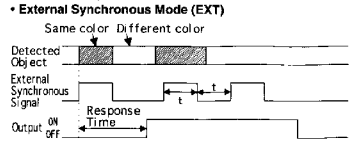
• "C+I" Inspection Mode

Since this mode inspects not only color components but also color brightness, this mode is ideal for inspecting the difference of similar colors. In this mode, the sensor is somewhat influenced by surrounding lights and deflections.

⑤ Synchronous Mode Selector

This selector is used to select the external synchronous mode or the internal synchronous mode.

• External Synchronous Mode (EXT)



This mode performs a color inspection synchronized with an external signal.

Note 1: The inspection can be performed only when an external synchronous signal rises.

Note 2: External synchronous signal should lasts for t in response to Response Mode.
F (Fast response): 0.2 msec or more
N (Normal response): 0.5 msec or more
S (Slow response): 3 msec or more

Note 3: Use the non-contact signals for external synchronous signal to prevent chattering.

• Internal Synchronous Mode (INT)

This mode performs a color inspection continuously according to the repeat response time.

⑥ Response Mode Selector

• Fast Response Mode (F)

This mode is used for high-speed inspection. Response time is 0.3 msec.

• Normal Response Mode (N)

This mode is used for normal inspection. Response time is 1 msec.

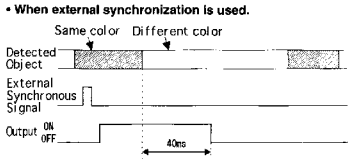
• Slow Response Mode (N)

This mode is used for stable inspection. Response time is 5 msec.

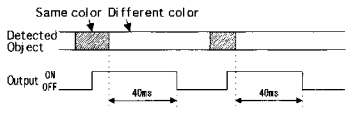
⑦ OFF-delay Timer (T-ON/T-OFF) Selector

This mode is used to select the use or unuse of OFF-delay Timer (40 msec). This mode holds the output for 40 msec.

• When external synchronization is used.



• When internal synchronization is used.



REFERENCE COLOR REGISTRATION

• Basic Operation by Manual Registration

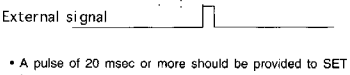
This mode is used for setting inspection modes or inspection tolerance on the operation panel.

(1) Set the synchronous mode to "INT".
(2) Fix the registration color and press the Reference Color Set Switch (SET).
(3) Set the inspection tolerance, inspection mode, response mode, and off-delay timer. (Registration can be performed by transmitting a pulse of 20 msec or more to SET input.)

• Remote Registration of Basic Color.

This mode is used for remote registration.

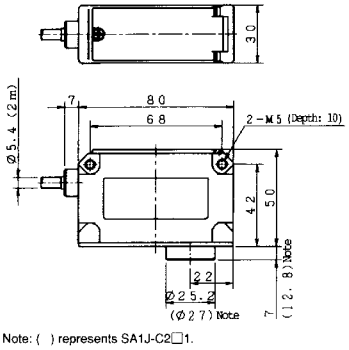
(1) Set the synchronous mode to "EXT".
(2) Set the inspection tolerance, inspection mode, response mode, and off-delay timer.
(3) Input signals are transmitted as follows.



- A pulse of 20 msec or more should be provided to SET input.
- The interval between SET signal and external synchronous signal should be 20 msec or more.
- Refer to each selector function for external synchronous signal.
- Registration timing can be determined by external synchronous signal.

When selecting FAST mode, select the manual registration instead of remote registration.

DIMENSIONS (All dimensions in mm.)



Note: ( ) represents SA1J-C2□1.

PANEL CUT-OUT